AMENDED CLAIMS

1 – 26. Canceled.

27. (new) An apparatus for use in a wellbore in an earth formation comprising:

(a) a resistivity tool having a body with a longitudinal axis substantially aligned with a longitudinal axis of the well bore, the body having a external surface;

(b) at least one pair of grooves in said external surface having an orientation substantially orthogonal to said longitudinal axis of said body;

(c) a first coil antenna placed near the external surface of the tool body, said first coil antenna having an axis substantially orthogonal to said longitudinal axis of said body and to said at least one pair of grooves and positioned in at least one hole intersecting said at least one pair of grooves;

(d) an antenna core material positioned in said at least one pair of grooves between said first coil antenna and said longitudinal axis of said body; wherein said first antenna and said core material define a plurality of small antenna loops having axes substantially parallel to an axis of said first coil antenna.

28. (new) The apparatus of claim 27 wherein said first coil antenna comprises a

transmitter antenna.

29. (new) The apparatus of claim 27 wherein said first coil antenna comprises a receiver antenna.

30. (new) The apparatus of claim 27 wherein said at least one pair of grooves comprises a plurality of pairs of grooves.

31. (new) The apparatus of claim 27 wherein a bottom of said at least one pair of grooves is substantially flat and parallel to said longitudinal axis of said body.

32. (new) The apparatus of claim 27 further comprising

(i) a plurality of grooves in said external surface having an orientation substantially parallel to said longitudinal axis of said body;

(ii) a second coil antenna placed near the external surface of the tool body, said second coil antenna having an axis substantially parallel to said longitudinal axis of said body and positioned in at least one hole intersecting said plurality of grooves.

33. (new) The apparatus of claim 32 wherein one of the first coil antenna and the second coil antenna comprises a transmitter antenna and the other of said first coil antenna and the second coil antenna comprises a receiver antenna.

34. (new) The apparatus of claim 27 wherein said antenna core material comprises a ferrite.

35. (new) The apparatus of claim 27 wherein said first antenna is operated at a single frequency.

36. (new) The apparatus of claim 27 wherein said a first antenna is operated at a plurality of frequencies.

37. (new) The apparatus of claim 27 wherein said longitudinal axis of said wellbore is substantially parallel to an interface in said earth formation.

38. (new) The apparatus of claim 27 wherein a signal received at said receiver antenna resulting from activation of said transmitter antenna is indicative of a distance to said interface from said wellbore.

39. (new) The apparatus of claim 37 wherein a signal received at said receiver antenna resulting from activation of said transmitter antenna is indicative of an orientation of said interface relative to said wellbore.

40. (new) The apparatus of claim 37 wherein a signal received from activation of said

receiver antenna resulting from activation of said transmitter antenna is indicative of relative resistivities of earth formations on opposite sides of said interface.

41. (new) The apparatus of claim 33 further comprising an additional receiver antenna between said transmitter antenna and said receiver antenna, and wherein a weighted average of signals received by said receiver antenna and said additional receiver antenna is indicative of at least one of (i) a distance to said interface, (ii) an orientation of said interface, and, (iii) relative resistivities of earth formations on opposite sides of said interface.

42. (new) The apparatus of claim 27 wherein said resistivity tool comprises an induction tool.

43. (new) A method of determining a resistivity property of an earth formation, the method comprising:

(a) conveying a resistivity tool into a well bore in said earth formation, said resistivity tool comprising:

(A) a body with a longitudinal axis substantially aligned with a longitudinal axis of the well bore, the body having a external surface,

(B) at least one pair of grooves in said external surface having an

orientation substantially orthogonal to said longitudinal axis of said body,

(C) a coil antenna placed near the external surface of the tool body, said first coil antenna having an axis substantially orthogonal to said longitudinal axis of said body and to said at least one pair of grooves and positioned in at least one hole intersecting said first plurality of grooves, and

(D) an antenna core material positioned in said at least one pair of grooves between said coil antenna and said longitudinal axis of said body;

(b) using said first antenna and said core material for defining a plurality of small antenna loops having axes substantially parallel to an axis of said first coil antenna;

(c) using said resistivity tool for acquiring a cross-component signal from said earth formation; and

(d) determining from said cross-component signal said resistivity property of said earth formation.

44. (new) The method of claim 43 wherein using said resistivity tool for acquiring said cross-component signal further comprises using said coil antenna as a receiver antenna.

45. (new) The method of claim 43 wherein using said resistivity tool for acquiring said cross-component signal further comprises using said coil antenna as a transmitter antenna.

46. (new) The method of claim 43 wherein said resistivity property is at least one of (i) an orientation of a bed boundary in said earth formation relative to said well bore, (ii) a resistivity conotrast of said earth formation between a side of a bed boundary in said earth formation proximate to said well bore and a side of said bed boundary distal to said well bore.

47. (new) The method of claim 46 wherein determining said resistivity property of said earth formation further comprises using an additional antenna as a transmitter antenna and analyzing in-phase and quadrature components of said cross-component signal.

48. (new) The method of claim 43 further comprising acquiring said cross-component signal at a plurality of frequencies.

49. (new) The method of claim 43 wherein acquiring said cross-component signal comprises inducing currents in the earth formation.